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**Performance and Analysis of Absorption Experiments on X-ray Heated  
Low-Z Constrained Samples\***

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Results of experiments on the absorption of niobium in a hot, dense plasma are presented. These results represent a major step in the development of absorption techniques necessary for the quantitative characterization of hot, dense matter. A general discussion is presented of the requirements for performing quantitative analysis of absorption spectra. Hydrodynamic simulations are used to illustrate the behavior of tamped x-ray-heated matter and to indicate effects that can arise from the two dimensional aspects of the experiment. The absorption spectrum of a low-Z material, in this case aluminum, provides a temperature diagnostic and indicates the advance of the absorption measurement technique to the level of application. The experimental technique is placed in context with a review of other measurements using absorption spectroscopy to probe hot, dense matter. It is shown that the overall experimental concepts, although understood, were not always achieved in previous experiments and therefore these do not satisfy the conditions necessary for quantitative analysis.

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